

**IEEE CINCINNATI
SECTION
NEWSLETTER
FEBRUARY 2005**



FEBRUARY MEETINGS

There are two events this month: First is a presentation/tour covering current research work in the University of Cincinnati's Department of Electrical & Computer Engineering and Computer Science. The second event is the 70th Annual Engineers & Scientists of Cincinnati's Awards Banquet. Details on each event follow:

AN EVENING AT U.C.

DATE: Thursday, February 24, 2005

PLACE : University of Cincinnati Faculty Center - Upper Room (second floor)

TIME : 5:30 p.m. to 6:00 p.m. - Social Time
6:00 p.m. to 7:00 p.m. - Dinner
7:00 p.m. to 9:00 p.m. - Program & Tour

COST FOR DINNER: \$10.00 for Student Members
\$15.00 for Members
\$20.00 for Non-Members

MENU SELECTIONS: Salad of Mixed Field Greens with Choice of Dressings, Seafood Provençal or Beef Bourguignonne, Seasonal Vegetable, Rice, Fresh Dinner Rolls and Butter, Coffee and Iced Tea, Chocolate Mouse or Granny Apple Pie. A cash bar will also be available. Attire will be business casual.

Please call the Cincinnati Section Voice Mailbox at **513-629-9380**, by **Noon, Tuesday, Feb. 22, 2005** if you plan to attend. Please leave your Name, IEEE Member Number, and a daytime telephone number. You can also make a reservation by e-mailing our Arrangements Chair, Charlie Nash, at cnash@ieee.org.

The Department of Electrical & Computer Engineering and Computer Science is hosting the Cincinnati Section, providing three presentations and tours to our members and guests. Dr. Hal Carter, the Department Head, has arranged for these presentations and tours.

The Presentations:

Photonics in Information Gathering and Processing Systems

Dr. Fred R. Beyette will highlight the use of photonics in information gathering/processing systems. In addition to presenting some of his early work on the development of smart read-head devices for page oriented optical storage systems, this segment of the presentation will also highlight some of his more recent work on the incorporation of photonic technologies into next generation biomedical and information processing systems.

Developing Culture-Based Biochips for Detecting Mycobacteria in Environmental Samples

Dr. Ian Papautsky will describe the development of a culture-based biochip for detecting mycobacteria in environmental samples. The biochips use the paraffinophilic nature of mycobacteria to rapidly detect and differentiate them from non-target microorganisms. Prototype biochips were experimentally tested to demonstrate rapid detection of mycobacteria in environmental samples collected from a municipal sewage treatment plant. Our successful demonstration of the culture-based biochip technology presents an alternative approach for developing new technology to track microorganisms in complex environmental samples.

Nondestructive Testing and Condition Evaluation of Highway Bridges

Dr. Helmicki's portion of the of the presentation will discuss system's engineering aspects of the health monitoring problem as applied to the area civil infrastructure systems including the development and application of techniques for that can practically be applied to full scale highway structures. Various measures of structural health and condition will be presented, and examples of field test results obtained will be presented.

About the Presenters:

Dr. Fred R. Beyette Jr. has been performing research in the areas related to Mixed Technology VLSI Design since 1988. From 1988 to 1995, his research effort contributed to work produced by materials, device and systems specialists at the NSF Engineering Research Center for Optical Computing Systems. After receiving his Ph.D. in Electrical Engineering from Colorado State University in 1995, Dr. Beyette spent the 1995/96 academic year at the University of Sheffield in the United Kingdom as a NSF International Postdoctoral Fellow where he studied the system level application of a photonic switching device based on a piezoelectric multiple quantum structure. In 1996, Dr. Beyette joined the Department of ECECS at the University of Cincinnati. He is currently performing research in areas related to multi-domain circuit and systems technologies. His research interests include hardware development for photonic information processing systems, the design of photonic/electronic interface components, optical memory and archival storage device technologies. He has published 29 research papers in journals related to the fields of photonics and optical computing and contributed to more than 100 conference papers (including 2 invited papers) presented at national and international meetings.

Dr. Arthur Helmicki has been with the University of Cincinnati since 1990. He received his BS from Boston University and his MS and PhD from Rensselaer Polytechnic Institute all in Electrical Engineering. The focus of his research has been in the development and application of practical, nondestructive evaluation techniques for structural identification, damage detection, condition assessment, health monitoring, and associated information technologies. Dr. Helmicki has performed instrumented monitoring, diagnostic testing covering various performance aspects of more than five dozen bridges in Ohio and Kentucky. His efforts have been supported and funded by numerous agencies including the National Science Foundation, Federal Highway Administration, Ohio Department of Transportation, and several companies. Dr. Helmicki has published over 150 technical articles. In addition to his active participation in the IEEE and the ASNT, he is a recipient of the ASCE Civil Engineering Research Foundation Charles Pankow Award for Innovation and is a founding member of the ASCE Steering Committee on Structural Identification of Constructed Facilities.

Dr. Ian Papautsky is Assistant Professor of Electrical Engineering and Director of the Biomedical Microsystems Laboratory at the University of Cincinnati. He received the B.S. degree in biomedical engineering from Boston University, Boston, MA, in 1995 and the Ph.D. degree in bioengineering from the University of Utah, Salt Lake

City, UT, in 1999. His Ph.D. work involved the use of microscale instrumentation for biomedical fluid applications at the Micro Instrumentation Research Laboratory. In 2000, he joined the Department of Electrical and Computer Engineering and Computer Science at the University of Cincinnati as an Assistant Professor. His research focuses on applying microelectromechanical systems (MEMS) technologies to biology, medicine, and environmental systems. His research interests include polymer microfluidic systems, environmental bio/chemical sensors, cell engineering, and plastic biochips/lab-on-a-chip devices. . He has published 15 refereed journal papers, 42 conference papers, edited 3 journal issues. He currently chairs the SPIE Microfluidics, BioMEMS, and Medical Microsystems Conference and served on the organizing committee for the Biomedical Engineering Society Conference (2003) and the IEEE Engineering in Medicine and Biology Conference (2002).

The Tours: The Department of ECECS will provide us with the opportunity to select one of several tours that will be hosted by faculty members from the department.

Directions: Parking is available at either the Woodside Drive Garage or the Campus Green Drive Garage (see map below). For directions to the campus, please see <http://www.uc.edu/directions/>. When you enter the Faculty Center, there are steps to the right that lead you up to the “Upper Room” .



70th Annual Engineers & Scientists of Cincinnati's Awards Banquet

ENGINEERS AND SCIENTISTS of GREATER CINCINNATI
invites you to attend the

70TH ANNUAL RECOGNITION and AWARDS PROGRAM
to be held on Thursday, February 24, 2005 at

Cincinnati Art Museum
953 Eden Park Drive
Cincinnati, OH

TIME: 5:30 P.M. - Social Time/Museum Tour (Cash Bar)
7:00 P.M. - Dinner
8:00 P.M. - Program

COST: \$40.00

This dinner is a joint meeting with the American Society of Civil Engineers (ASCE), the Ohio Society of Professional Engineers, and the Northern Kentucky Chapter of the Kentucky Society of Professional Engineers (NKSPE). In addition, many other technical and professional societies will be represented by those in attendance. Come and share experiences with other professionals, make new friends, enjoy good food and meet this year's award recipients.

For Reservations:

Reservations may be made by calling either Jean DeLorenzo or Brenda Lycans at Woolpert, Inc. (513)-272-8300. Please provide names for nametags.

Please make reservations by **February 18, 2004**. If a reservation is cancelled prior to the February 18th deadline, no charge will be incurred. However, if cancellation is received after the 18th we will have to ask for full payment.

Payment: You may pay at the registration table with either cash or check. Checks should be made payable to "ESC".

Speaker: The speaker for the evening will be Mr. Dan Hurley, Vice President of the Cincinnati Historical Society.

Questions: If you have questions or need additional information, feel free to contact Jean or Brenda at the phone number listed above.

Directions: For directions to the Cincinnati Art Museum, visit their web site at:
<http://www.cincinnatiartmuseum.org/greatplace/directions.shtml>

CHAIR'S MESSAGE

by Jim Everly, Section Chair

Last month's meeting on patent law was presented by attorneys Douglas Scholer and C. Richard Eby, both electrical engineers. They presented an overview of the U.S. Patent system and talked about the application process, what to do to protect your ideas before they are patented, and how to protect them once they are patented. I found the meeting to be interesting and informative and was pleased with the number of section members in attendance.

The section Executive Committee met in January to review the section budget and to plan meetings and activities for 2005. We are currently in the process of forming the budget for the upcoming year. If you have ideas for section meeting or are interested in technical workshops on Saturday morning, please contact me with your ideas.

Two Cincinnati Section Executive Committee positions are currently available. The committee is searching for a Professional Activities Chairperson (PACE), and a Member at Large. The Executive committee meets four times a year and is responsible for section activities. If you have an interest in either of these positions please contact me via email or telephone.

NEW MEMBERS

The following individuals are IEEE members who are new to our Section:

Kurt Auer	Raghu S. Madala
Eric D. Benz	Donna Marion
Diana Boone	Shobana Rallapalii
James R. Cline	Gokhan Sahin
Bobby D. Collier	Sean T. Setter
Joseph R. Gordon	Raghuraj Shahapurkar
James Hatton	Hua Tan
Daniel R. Hollingsworth	Andrew T. Wright
Woosung Kim	Nesreen I. Ziedan

We wish to welcome these new members to our Section!!!

Scanning the Past: A History of Electrical Engineering from the Past

Submitted by Dick Reiman, Historian

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Harry Diamond

Sixty years ago this month, the PROCEEDINGS OF THE INSTITUTE OF RADIO ENGINEERS (IRE) included a paper on the theory of radio frequency transformers by Harry Diamond and E.Z. Stowell. Diamond, for whom the Harry Diamond Memorial Award of the IEEE is named, was employed at the National Bureau of Standards in 1928. Stowell recently had joined the Federal Telegraph Company in Palo Alto, CA, after working at the Bureau of Standards. from 1924 to 1927.

In their paper Diamond and Stowell noted that the effect of distributed capacitance coupling between transformer windings typically had been neglected in the analysis of radio frequency amplifiers. They provided equations and graphs which included this effect and stated that their analysis gave better agreement with experimental results than reported previously.

Harry Diamond was born in Quincy, MA, in 1900 and graduated in electrical engineering from the Massachusetts Institute of Technology in 1922. He then worked for General Electric Company for about 18 months before becoming an electrical engineering instructor at Lehigh University, where he taught from 1923 to 1927. He received the M.S. degree in electrical engineering from Lehigh in 1925 and joined the Radio Section of the National Bureau of Standards in July 1927.

Diamond's first assignment at the Bureau of Standards was to work on the development of radio aids for use in aviation. Subsequently, he designed a system for voice radio communication which enabled pilots to make blind landings. He participated in tests using a Bureau of Standards station in College Park, MD, until the system was turned over to the Department of Commerce in 1933. The College Park facility was closed in 1934, and Diamond was transferred to Washington, DC. He was author or coauthor of nine IRE papers on radio aids to aviation published between 1929 and 1937.

During the 1930's, Diamond headed a project to develop a high-altitude weather telemetry system for the United States Navy. With colleagues including Francis W. Dunmore and Wilbur S. Hinmann, Jr., Diamond developed what became known as a radiosonde system. They used latex rubber balloons which became available in sizes large enough to lift a small radio transmitter to a great height at reasonable cost by the mid-

1930's. Data from the upper atmosphere were transmitted to ground receivers over distances of up to 200 mi. The transmitters were designed to operate at very low temperature and pressure and to require minimum power. They employed miniature vacuum tubes operated at frequencies of the order of 180 MHz. A similar unit was developed for the Navy to be used as automatic weather stations on islands or other remote locations. By 1940 the radiosondes enjoyed wide use by the United States Weather Bureau and they also were adopted by researchers studying cosmic rays at extreme altitudes. Diamond, Dunmore, and Hinmann published an IRE paper on "radio meteorography" in October 1938.

Beginning in December 1940, Diamond directed a major effort at the Bureau of Standards to develop radio-actuated proximity fuzes for military applications. Diamond and Hinmann invented a detector which would cause detonation when radio waves reflected from a target exceeded a threshold value. The technology was a natural outgrowth of the radiosonde transmitter, and large quantities of several types of proximity fuzes were produced during World War II.

Soon after Diamond's untimely death in 1948, a number of his friends and colleagues established the Harry Diamond Memorial Award. It was first awarded by the IRE and the IEEE has continued to award it in recognition of "outstanding technical contributions in the field of government service in any country, as evidenced by publication in professional society journals." Diamond's close colleague, Wilbur S. Hinmann, Jr. received the Harry Diamond Memorial Award in 1956 for his contributions to radio meteorology and proximity fuzes.

James E. Brittain

School of History, Technology, and Society, Georgia Institute of Technology

IEEE NEWS

Current Issue of IEEE's "The Institute" is now on-line
at <http://www.ieee.org/theinstitute>.

In this issue:

- Student Ethics Competitions Planned for All 10 IEEE Regions. The IEEE Ethics and Member Conduct Committee wants to raise the ethics awareness of IEEE members while they're still in school. To this end, the committee is launching the IEEE Student Ethics Competition, which will provide student members with experience in applying ethical concepts to situations that might arise in the workplace. Find out more at <http://boldfish.ieee.org/u/student47/04824637>
- Matching Dollars Add Weight to Gift Giving. Ever think about making a contribution to the IEEE Foundation but didn't feel your gift would make a difference? You could get more bang for your buck if your employer has a matching gift program, which might double or triple your donation. Many companies have matched donations to the foundation, which supports educational and public awareness programs about engineering. Read more at <http://boldfish.ieee.org/u/match48/04824637>
- Educational Activities Awards Recognize Nine. From General Motors Corp. to teachers in Alabama and Rhode Island, the 2004 IEEE Educational Activities Board Awards honored nine recipients found to have made a difference in engineering education. Find out more about the recipients at <http://boldfish.ieee.org/u/awards49/04824637>

(Continued on Page 9)

Help the UC Robot Team win the IGVC in 2005!

Dear UC Robotics Supporter:

The UC Robot Team hopes to compete in the Intelligent Ground Robotics Competition (IGVC) in Traverse City, Michigan, north of Detroit, June 11-13, 2005. To compete, student teams must design and construct a mobile robot that will autonomously navigate an obstacle course using state of the art machine vision, laser scanner, GPS and artificial intelligence computing. The IGVC sponsors believe that the development of future engineers, scientists, and leaders in these disciplines is crucial to continued global industrial competitiveness. The competition is of the highest caliber and has included Virginia Tech, Ohio State University, the University of Michigan, and international teams from Japan and Canada.

Our student team members and faculty advisor meet regularly each Friday to design, build, and test the complex Bearcat robotic vehicles. We are adding more sensors and refining the original prototype Bearcat III, and now need funding for development of a new robot, The Bearcat Cub. This robot needs several remaining critical components. We need a laptop, laser scanner, GPS and other components.

We are seeking individual or corporate sponsors to help the UC Robot Team in the competition.

- Suggested levels of sponsorship
 - \$25 Bronze Level
 - \$50 Silver Level
 - \$100 Gold Level
 - \$200 Platinum Level
 - \$250 or more Iridium Level

In return for sponsorship we will:

- Display your company logo on the Bearcat robot vehicle, team T-shirts, and event booth
- Display your company logo on our Web page at: <http://www.robotics.uc.edu>

Visit our website to share our design technology and follow the development of **The Bearcat Cub** throughout the design competition.

Donations may be made to the:

UC Center for Robotics c/o The UC Foundation—pledge/sponsorship form attached.

Please feel free to call Ernie Hall at (513) 382-3909 to discuss this opportunity.

More information on the contest may be found at: <http://www.igvc.org/> And at our web site at: <http://www.robotics.uc.edu>

Sincerely,

All members of the UC robotics team.

Justin Gaylor [gaylorjd@email.uc.edu], Undergraduate Team Leader

Masoud Ghaffari [ma_ghaffari@yahoo.com], Graduate Team Leader

Ernest L. Hall, Faculty Advisor to the Robot Team, Ernie.Hall@uc.edu



Support BearCat Cub In 2005

The UC Robotics Team urgently needs your support to take their new BearCat Cub to the Intelligent Ground Vehicle Competition in 2005 robotics. Your contribution is greatly appreciated.

Yes, I would like to support the **UC Engineering Robotics Team and The BearCat Cub.**

Enclosed is a gift of: [] \$25 [] \$50 [] \$100 [] \$200 [] \$250 [] Other* \$ _____

Or, I would like to support the **UC Engineering and Robotics Team and The BearCat Cub** by pledging \$ _____ to be paid over ____ (1-5) years.

Your gift is payable by check or credit card to:

UC Foundation/UC Center for Robotics

Send to:

**UC Engineering Robotics Team
University of Cincinnati
College of Engineering Development Office
P.O. Box 210018
Cincinnati, OH 45221-0018**

Visa, MasterCard, Discover or American Express accepted

Credit Card # _____ Expiration Date _____

Name (Please Print) _____

Signature _____

Address: _____

City: _____ St: _____ Zip: _____

Telephone: (_____) _____ Fax: (_____) _____

E-mail: _____

ON-LINE GIVING: Please log onto **www.GiveTo.UC.edu**

**Your total commitment of \$1,000 or more qualifies for recognition through the UC President's Council and the College of Engineering's Baldwin Society.*

THANK YOU FOR YOUR SUPPORT

IEEE NEWS

(Continued from Page 6)

- IEEE Fellow Low Teck Seng Holds Special View of Teaching. Low Teck Seng wants nothing more than to change the way university students learn engineering and technology, something he's been doing for some time. Read more at <http://boldfish.ieee.org/u/teach4b/04824637>
- Two Candidates Run for 2006 President-Elect. Fellow Leah Jamieson and Senior Member Gerald Peterson will be on the 2005 election ballot. They were recommended by the IEEE Nominations and Appointments Committee and selected by the Board of Directors at its November meeting. Read more about the candidates at <http://boldfish.ieee.org/u/candidates4c/04824637>
- Awards Board Program Needs You. If you've ever wanted to get involved with the IEEE awards program, apply for one of the seven vacancies on the Awards Board and its committees. Learn more at <http://boldfish.ieee.org/u/needs4d/04824637>
- Regional Conferences Bring Technology Home. Just because regional conferences are relatively small doesn't mean they are unsophisticated. Such conferences can confer many professional and personal benefits on those who attend. Read more at <http://boldfish.ieee.org/u/regconf4f/04824637>
- Record Number of Papers Collected in Power Electronics Proceedings. Last year's IEEE Applied Power Electronics Conference featured a record 297 papers, in all areas of power electronics. The proceedings of the conference are now available. For more information, or to purchase, visit ShopIEEE at <http://boldfish.ieee.org/u/peproceed4g/04824637>

Call for Papers

EURASIP Journal on Applied Signal Processing Special Issue on Wireless Location Technologies and Applications

The development of communications systems that include location and tracking capabilities has generated great interest in cellular and wireless local/personal area networks. A host of potential services can be enabled by suitably accurate location and tracking facilities in conjunction with appropriate communications and data transfer platforms.

From established radio techniques, such as WLAN (e.g. IEEE 802.11 a/b/g), to emerging WPAN networks (e.g. Bluetooth and IEEE 802.15.4) to newer Ultra-Wideband (UWB) systems (e.g. IEEE 802.15.3a and IEEE 802.15.4a), a common denominator to drive adoption and growth is implementing innovative services in addition to data transfer. Whether the positioning techniques are based on signal strength, time of flight, or on fingerprinting techniques, they offer the potential for new applications which rely on the knowledge of the location of the wireless nodes.

A large number of issues must be addressed to move from coarse delay measurement to useful range estimation for tracking purposes. Issues include generation of accurate delay / ranging estimates, proper operation in dense multipath environments, delay / ranging information sharing between nodes, computationally efficient algorithms, algorithms for low infrastructure environments, dealing with NLOS as well as integration with usable applications. This special issue will address the state of the art in wireless location technologies and applications with particular emphasis on accurate results in low infrastructure environments.

Topics of interest include (but are not limited to):

- Delay / ranging estimation techniques for wireless systems
- Location techniques for ad hoc networks
- Tracking algorithm performance in indoor systems
- Estimation of processing power requirements of competing techniques
- System architectures
- Multiantenna systems for positioning
- Fundamental accuracy limits
- Delay / ranging estimation techniques for NLOS conditions
- Field trials of ranging or positioning devices

Authors should follow the EURASIP JASP manuscript format described at the journal site

<http://www.hindawi.info/asp/>. Prospective authors should submit an electronic copy of their complete manuscript through the EURASIP JASP's manuscript tracking system at journal's web site, according to the following timetable:

Manuscript Due:	June 1, 2005
Acceptance Notification	October 1, 2005
Final Manuscript Due:	January 1, 2006
Publication Date	2nd Quarter, 2006

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NEWS from IEEE-USA

1828 L Street, N.W., Suite 1202, Washington, D.C. 20036-5104

IEEE-USA Seeks to Prevent Copyright Infringement, Preserve Technological Innovation in Electronic File Sharing: Amicus Brief Filed in U.S. Supreme Court Today

WASHINGTON (24 January 2005) -- In a friend-of-the-court filing today with the U.S. Supreme Court, IEEE-USA proposed an approach to prevent copyright infringement while preserving technological innovation.

"A careful balance must be struck between copyright incentives for authors to create works of authorship and the right of the public to benefit from technical means to reproduce and distribute those works," IEEE-USA Intellectual Property Committee Vice Chair Andrew Greenberg said.

According to IEEE-USA's brief, a provider of dual-use technology (capable of both infringing and non-infringing use, such as a VCR or a file-sharing system) should not be liable for the infringements of users unless the provider has actively induced the user to infringe.

"File-sharing technology serves as the basis for the Internet and should be unrestricted to produce future revolutionary digital products," Greenberg said. "On the other hand, copyright owners must not be left to the mercy of those who set out to knowingly and intentionally induce third parties to infringe."

The case in question, "Metro-Goldwyn-Mayer Studios v. Grokster," involves a lawsuit brought by entertainment companies against Grokster and StreamCast Networks, two companies that offer peer-to-peer file-sharing software. The suit claimed that operators of file-sharing systems should be held responsible when their users copy music, movies and other protected works without permission.

At issue is whether and when restrictions can be placed on file-sharing technologies with both non-infringing and infringing uses.

In August 2004, the Ninth Circuit Court of Appeals ruled that peer-to-peer networks are not liable for copyright infringement because, like the VCRs in the 21-year-old Sony Betamax Supreme Court ruling, they can be used for legitimate "non-infringing" purposes.

On 12 December 2004, the U.S. Supreme Court granted a writ of certiorari to consider this case. Oral arguments will be on 29 March, with a decision expected this spring.

IEEE-USA Supports Prolonging Life of Hubble Space Telescope in Statement to House Science Committee

WASHINGTON (2 February 2005) -- NASA should explore all possible avenues toward prolonging the useful life of the Hubble Space Telescope, IEEE-USA said today in a statement to the House Science Committee.

The most urgent need is a servicing mission to refurbish and upgrade the Hubble so that it can continue gathering high-resolution images of astronomical objects. News reports, however, indicate that The White House might eliminate mission funding from its 2006 budget request.

"The Hubble telescope has resulted in some of the most important scientific discoveries in the last decade," said Dr. Russell Lefevre, IEEE-USA vice president, technology policy. "Our understanding of the universe has grown immensely, and it would be a tragedy for the world's scientific community if the servicing mission was cancelled."

Launched on 25 April 1990 by the crew of the Space Shuttle Discovery, the Hubble is a cooperative program of NASA and the European Space Agency to operate a space-based observatory for the benefit of science and humanity. Just last year, it detected more than 100 planets around distant stars, captured images of distant galaxies and recorded the first images of the edge of the known universe. Space-shuttle astronauts have serviced the Hubble four times, the last servicing in 2002.

A service mission would keep the Hubble operational until the James Webb Space Telescope is launched in 2011, at the earliest. Without such a mission, the 2.4-meter reflecting telescope could stop sending its photos as early as 2007.

"Prospects for continued operation of Hubble until that date without a servicing mission are small," the IEEE-USA statement said. "The absence of the Hubble's extraordinary abilities would adversely impact astronomical research."

IEEE-USA's November 2004 position supporting servicing of the Hubble is available at <http://www.ieeeusa.org/policy/positions/hubble.asp>. You can view today's statement to the House Science Committee at <http://www.ieeeusa.org/policy/policy/2005/020205.asp>.

The IEEE Cincinnati Section Executive Committee

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